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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/665,846

09/17/2003

Andrew W. Wilson

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EXAMINER

CHOU, ALAN S

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/665,846	Applicant(s) WILSON, ANDREW W.	
	Examiner ALAN S. CHOU	Art Unit 2451	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 30-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 30-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in responsive to amendments filed on September 22, 2008.

Claims 1-22, 30-34 are presented for examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8, 10-17, 19-22, 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dellacona U.S. Patent Number 6,799,224 B1 (hereinafter Dellacona), further in view of Coates et al. U.S. Patent Application Publication Number 2005/0246393 A1 (hereinafter Coates), and further in view of Neal et al. U.S. Patent Number 6,990,528 B1 (hereinafter Neal).

3. As per claims 1, 11, 17, Dellacona discloses a method for storing data, comprising: transmitting a storage operation request to one of at least two controllers, the at least two controllers being capable of managing communication with a plurality of targets (see bypass interface cards on column 4 line 24-39); directing the storage operation request to an operational one of the at least two controllers when the one of the at least two controllers is inoperable (see initiates logical connect and disconnect of the disk device on column 4 line 61 to column 5 line 10 and XOR raid on column 5 line 10-15); processing the storage operation request with the operational one of the at least

Art Unit: 2451

two controllers (see hot swap bypass interface card 370 on column 7 line 15-35 and figure 1). Claims 11 has an additional limitation of generating a plurality of storage volumes includes at least one storage devices (see electronic device registration devices on column 4 line 48-65).

4. As per claims 1, 11, 17, Dellacona discloses a method for storing data as recited in claim 1, wherein the directing of the storage operation request including routing the storage operation request through a bypass interface card. Dellacona does not disclose express routing the request through a L4 router. Coates teaches the use of a L4 routing switch for load balancing purposes in a network fabric (see page 2 section [0014]). Dellacona and Coates are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate L4 routers as switching devices in the network fabric. The motivation for doing so would have been to allow network load balancing with the router. Therefore, it would have been obvious to combine Dellacona with Coates for the benefit of L4 router in the network fabric to obtain the invention as specified in claims 1, 11, 17.

5. As per claims 1, 11, 17, Dellacona does not disclose expressly using an external queue pair and internal queue pair to establish communication between two controllers and an internal target devices through a reliable connection sessions. Neal teaches the generating of a reliable datagram queue pair (RD QP) and then store the same reliable datagram domain within an end-to-end context (EEC) at the local Host Channel Adapter (see column 3 line 17-29). Dellacona and Neal are analogous art because they are

Art Unit: 2451

from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporating the use of an internal queue pairs in form of End-to-End Context. The motivation for doing so would have been to allow multiple RD QP to share a single EEC and thus better load balancing. Therefore, it would have been obvious to combine Dellacona with Neal for the benefit of using an external and internal queue pairs in the network fabric to obtain the invention as specified in claims 1, 11, 17.

6. As per claim 2, Dellacona discloses a method for storing data as recited in claim 1, further comprising: communicating data for storage operations using to the at least to controllers through a network fabric interconnect (see Fibre Channel bus on column 3 line 50-55).

7. As per claim 3, Dellacona discloses a method for storing data as recited in claim 1, further comprising: communicating data between at least one storage device and at least one host using the operational one of the at least two controllers (see connect and disconnect of disk device by bypass interface cards on column 5 line 1-5).

8. As per claim 4, Dellacona discloses a method for storing data as recited in claim 1, wherein the storage operation request is one of a request to store of data to a target and a request to read data from a target device, the target device being a storage device (see read and write to disk device on column 4 line 45-55).

9. As per claim 10, Dellacona discloses a method for storing data as recited in claim 2, wherein the directing the storage operation request includes determining a correct path through the network fabric interconnect to a proper storage device (see connect and disconnect of disk device by bypass interface cards on column 5 line 1-5).

10. As per claim 12, Dellacona discloses a method for storing data as recited in claim 11, further comprising: assigning control of each of the plurality of storage volumes to a corresponding separate controller (see electronic device registration on column 4 line 48-65).

11. As per claim 13, Dellacona discloses a method for storing data as recited in claim 11, further comprising: when a controller for a particular storage container fails, accessing data located on other storage containers through XOR (see XOR Raid on column 5 line 10-15).

12. As per claim 14, Dellacona discloses a method for storing data as recited in claim 11, further comprising: managing the plurality of storage volumes by spreading the processing of input/output requests among all of a plurality of controllers, each of the plurality of controllers controlling a corresponding one of the plurality of storage volumes (see electronic device registration on column 4 line 48-65).

Art Unit: 2451

13. As per claim 15, Dellacona discloses a method for storing data as recited in claim 11, wherein the storage containers are RAID devices (see RAID on column 5 line3 10-15).

14. As per claim 16, Dellacona discloses a method for storing data as recited in claim 11, wherein the storage device are disk drives (see disk storage device on column 4 line 35-40).

15. As per claim 5, Dellacona discloses a method for storing data as recited in claim 1, wherein the directing of the storage operation request including routing the storage operation request through a bypass interface card. Dellacona does not disclose express routing the request through a L4 router. Coates teaches the use of a L4 routing switch for load balancing purposes in a network fabric (see page 2 section [0014]). Dellacona and Coates are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate L4 routers as switching devices in the network fabric. The motivation for doing so would have been to allow network load balancing with the router. Therefore, it would have been obvious to combine Dellacona with Coates for the benefit of L4 router in the network fabric to obtain the invention as specified in claim 5.

Art Unit: 2451

16. As per claims 6, 20, 21 neither Dellacona nor Coates disclose expressly the use of remote direct memory access between devices and the routers. Neal teaches the use of RDMA to access memory spaces on remote nodes (see column 7 lines 27-35). Dellacona and Neal are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate RDMA accessing techniques within the network fabric. The motivation for doing so would have been to allow devices to remotely access memories from other devices. Therefore, it would have been obvious to combine Dellacona with Neal for the benefit of using RDMA in the network fabric to obtain the invention as specified in claims 6, 20, 21.

17. Claim 21 has an additional limitation of using an external and internal queue pair. Dellacona does not disclose expressly using an external queue pair and internal queue pair to establish communication between two controllers and an internal target devices through a reliable connection sessions. Neal teaches the generating of a reliable datagram queue pair (RD QP) and then store the same reliable datagram domain within an end-to-end context (EEC) at the local Host Channel Adapter (see column 3 line 17-29). Dellacona and Neal are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporating the use of an internal queue pairs in form of End-to-End Context. The motivation for doing so would have been to allow multiple RD QP to share a single EEC and thus better load balancing. Therefore, it would have been obvious to combine Dellacona with Neal for

Art Unit: 2451

the benefit of using an external and internal queue pairs in the network fabric to obtain the invention as specified in claim 21.

18. As per claim 22, Neal discloses a network architecture as recited in claim 21, wherein each one of the at least two routers utilizes at least one internal queue pair to communicate with at least one external queue pair of the host (see reliable datagram queue pair (RD QP) and end-to-end context (EEC) on column 3 line 17-29).

19. As per claim 30, Dellacona discloses a network architecture as recited in claim 21, wherein the at least two controllers are RAID controllers (see RAID on column 5 line 10-15).

20. As per claim 31, Dellacona discloses a network architecture as recited in claim 21, wherein the plurality of target is a plurality of storage devices (see disk storage device on column 4 line 35-40).

21. As per claim 32, Dellacona discloses a network architecture as recited in claim 21, wherein the plurality of storage devices is a plurality of disk drives (see disk storage device column 4 line 35-40).

22. As per claims 33, 34, Dellacona discloses a network architecture as recited in claim 21, wherein when one of the at least two switches or L4 routers is inoperable, the

Art Unit: 2451

operable one of the least two L4 routers or switches is capable of communicating data between the host and the at least two target devices (see initiates logical connect and disconnect of the disk device on column 4 line 61 to column 5 line 10 and XOR raid on column 5 line 10-15).

23. As per claims 7, 19, neither Dellacona nor Coates disclose expressly the use of InfiniBand-type fabric. Neal teaches the use of InfiniBand-type fabric within the storage network (see column 1 line 33-47). Dellacona and Neal are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate InfiniBand-type fabric within the network storage system. The motivation for doing so would have been to allow devices to access other nodes on the SAN network. Therefore, it would have been obvious to combine Dellacona with Neal for the benefit of incorporating InfiniBand-type fabric in the network storage system to obtain the invention as specified in claims 7, 19.

24. As per claim 8, Dellacona discloses a method for storing data as recited in claim 7, wherein the transmitting the storage operation request includes transmitting the request through an operation one of at least two bridge chips (see bridge chips on column 6 line 30-45).

Art Unit: 2451

25. Claims 9, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dellacona as applied to claims 8 above, and further in view of Coates et al. U.S. Patent Application Publication Number 2005/0246393 A1 (hereinafter Coates), and further in view of Neal et al. U.S. Patent Number 6,990,528 B1 (hereinafter Neal), and further in view of Fox et al. U.S. Patent Application Publication Number 2002/0147945 A1 (hereinafter Fox).

26. As per claims 9, 18, neither Dellacona nor Coates disclose expressly the use of SATA-IB bridge chips. Fox teaches the use of SATA standard with the Fibre Channel networks (see page 3 section [0025]). Dellacona and Fox are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate SATA type bridge chips into network fabric within the network storage system. The motivation for doing so would have been to allow SATA devices to interact with other nodes on the fabric network. Therefore, it would have been obvious to combine Dellacona with Fox for the benefit of incorporating SATA-IB bridge chips within the network fabric obtain the invention as specified in claims 9, 18.

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Distributed Storage Resource Management in a Storage Area Network by Harris et al., U.S. Patent Application Publication Number 2005/0091221 A1.

Response to Arguments

28. Applicant's arguments, see Remarks, filed September 22, 2008, with respect to the rejection(s) of claim(s) 1, 11, 17, 21 under 35 USC 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of further in view of Coates et al. U.S. Patent Application Publication Number 2005/0246393 A1, and further in view of Neal et al. U.S. Patent Number 6,990,528 B1.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2451

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan S. Chou whose telephone number is (571) 272-5779. The examiner can normally be reached on 7am-3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (571)272-3964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AC
/John Follansbee/
Supervisory Patent Examiner, Art Unit 2451